

IN THE APPLICATION

OF

TERRY M. WATERMAN

AND

ORVILLE H. WATERMAN

FOR A

DEVICE TO PROTECT VEHICLE WHEELS AND AXLES FROM DEBRIS

DEVICE TO PROTECT VEHICLE WHEELS AND AXLES FROM DEBRIS

CROSS-REFERENCE TO RELATED APPLICATION

5 This application claims the benefit of U.S. Provisional
Patent Application Serial No. 60/396,095, filed July 17, 2002.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

10 The present invention relates to heavy equipment wheels and
more specifically to a device mounted inside a wheel drum to keep
debris or dirt from building up inside the wheel or around a
vehicle axle.

2. DESCRIPTION OF RELATED ART

15 Drum-type wheels consist of a hollow outer cylindrical drum,
an inner cylindrical hub, and two inner sidewalls to connect the
drum to the hub. The inner sidewalls are generally conical in
shape. Because the sidewalls are conical in shape, they meet the
hub at an acute angle, thus forming a crevice between the hub and
20 the sidewall where trash could build up.

Wheels on trash compactor vehicles face serious environmental
assault. Because these vehicles operate in dumpsites, the wheels
are exposed to wire, cable, sharp metal objects, and various other

types of debris. This debris tends to get wrapped around the wheel axles, to get stuck inside the wheels, or to puncture or otherwise damage the sidewalls. To avoid mechanical breakdown of the wheels, this debris must be removed on a continual basis. However, due to the design of most wheels and the relative position in which they are mounted on the vehicles, the wheels must be removed in order to clear the debris. For trash compactor wheels, this process takes two men over eight hours and necessitates the use of heavy equipment. Moreover, the trash compactor vehicle is out of service during this debris removal process.

A discussion of the related art follows:

U.S. Patent No. 5,676,493, issued on October 14, 1997, to R.J. Brockway, describes a wheel with an access panel on its outer side. The access panel is large enough to allow a person to insert their head and arms in order to remove debris accumulated on the inner side of the wheel without having to remove the wheel.

U.S. Patent Nos. 5,330,260, issued on July 19, 1994, 5,451,100, issued on September 19, 1995, and 5,553,932, issued on September 10, 1996, to E. Freeman describe installing cutter blades on the axle and the sidewall in order to cut refuse before it can build up on the axle.

U.S. Patent No. 6,045,295, issued on April 4, 2000, to J. E. Puchosic, describes using a wheel-mounted hook member to ensnare

debris, and an axle-mounted serrated blade to sever debris before it reaches the wheel axle.

U.S. Patent No. 2,146,882, issued on February 14, 1939, to D.B. Baker et al., describes a conical shield to protect sprockets on a crawler-type tractor.

U.S. Patent No. 4,379,565, issued on April 12, 1983, to C. F. Riddle, describes an annular deflector plate mounted around the axle housing of a compaction vehicle.

U.S. Patent No. 5,733,020, issued on March 31, 1998 to R.A. McCartney et al., describes an axle shield attached to the vehicle to cover the inner portion of a wheel for inhibiting wire, cable and the like from entangling the axle assembly of a compactor vehicle.

U.S. Patent No. 6,076,843, issued on June 20, 2000, to J.P. Sewell, describes the attachment of a guard member composed of plates around the axle assembly of a landfill compactor vehicle. These plates are intended to reduce the amount of debris getting wrapped around the axle assemblies.

U.S. Patent No. 5,769,507, issued on June 23, 1998, to R.J. Brockway, describes a compactor wheel axle guard system comprising a ring that encircles the outer edge of the wheel, and that acts to deflect debris.

Patents that show axle shrouds include U.S. Patent No. 5,951,123, issued on September 14, 1999, to D.W. Bomstad et al. showing a guard assembly attached to the axle and rotating with

the wheel; U.S. Patent No. 5,967,242, issued on October 19, 1999,
to J.O. Caron et al. describing a shroud covering the axle of a
compactor vehicle; and U.S. Patent No. US 6,322,170 B1, issued on
November 27, 2001, to H.A. Knell et al. showing curved guards
5 attached to the vehicle body to protect the axle.

Patents that show scrapers include U.S. Patent No. 4,818,040,
issued on April 4, 1989, to E.J. Mezzancella et al. describing a
scraper plate parallel to the axle that scrapes debris as the
wheel rotates, and U.S. Patent No. 5,967,630, issued on October
10 19, 1999, to J.P. Sewell describing a scraper that attaches to the
vehicle body or the axle.

The present invention solves the above-mentioned problems by
firstly, covering some or all of the sidewall with a plate.
Because a plate is approximately planar, it joins the hub at a
15 right angle. Furthermore, the plate meets the sidewall at
approximately a right angle or greater, thus avoiding a new
problem of trash build up in a crevice near the outer rim.

Secondly, to further minimize trash build up, the present
invention includes gussets mounted on the plate to sweep trash
20 away from the wheels.

Thirdly, the present invention is made of thicker material
than the prior art to prevent trash from puncturing through the
plate.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

SUMMARY OF THE INVENTION

5 An annular plate is attached to a drum-type wheel so that the interior of the wheel is no longer exposed to the outside environment. The outside circumference of the plate is connected either to the edges of the drum or to the inner side walls that
10 connect the drum to the hub. The inside circumference of the plate is connected to the hub or hub extension. The plate is substantially perpendicular to the drum and the axis of rotation. Welding and gussets were used to hold the plate in place. These gussets can be located either (1) on the outside of the plate or
15 (2) on the inside of the plate. If located on the outside of the plate, the gussets will also serve as debris deflectors. If the plate is made from heavy material, such as structural steel, it will protect the sidewalls from operational, environmental damage.

Accordingly, it is a principal object of the invention to
20 protect the sidewalls of a drum-type wheel from environmental assault by sharp objects.

It is a further object of the invention to reduce the amount of trash becoming trapped in the wheel rims.

Still another object of the invention is to deflect debris away from the wheel and axle of a vehicle, such as a landfill compactor vehicle.

5 It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.
10

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an environmental, perspective view of a landfill compacting vehicle in shadow showing the inner side of a wheel employing one embodiment of the present invention.
15

FIG. 2 is a perspective view of a prior art wheel.

FIG. 3 is an exploded, unassembled, perspective view of a first embodiment of the present invention.

20 FIG. 4 is an assembled view of the FIG. 3 apparatus.

FIG. 5 is an exploded, unassembled, perspective view of the second embodiment of the present invention.

FIG. 6 is an assembled view of the FIG. 5 apparatus.

FIG. 7 is a cross-sectional view of the FIG. 4 apparatus showing a wheel employing the present invention.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

5
A first embodiment of the present invention is illustrated in FIG. 1 on a farm tractor 10 as an annular planar plate 21 that
10 mounts inside a drum-type wheel 13 consisting of a drum 15, a hub 17, and sidewall 19. Four trapezoidal shaped gussets 23 supported individually by a smaller triangular gusset 25 are mounted diametrically and spaced 90 degrees apart on the planar plate 21 to deflect debris. The smaller supporting triangular shaped
15 gussets 25 provide adequate support to the trapezoidal gussets 23.

FIG. 2 depicts the prior art drum-type wheel 13' having a drum 15' with a concave sidewall 19' that would inherently collect debris readily around the hub 17'. The two embodiments
illustrated in FIGS. 3 and 4 (first embodiment) and FIGS. 5 and 6
20 (second embodiment) are designed to fit wheels for Caterpillar landfill compactor vehicles having model numbers: Cat 826G and Cat 836. The shape of the gussets 23 and 25 was easily adapted to

these individual vehicle peculiarities. Thus, the invention could be used on most, if not all, drum-type wheels of any vehicle.

In the preferred first embodiment depicted in FIGS. 3 and 4, the annular plate 21 is made of ½-inch thick structural steel. The gussets 23 supported by 25 are made of an inch thick structural steel. Referring to FIGS. 3 and 5, the plate 21 is placed around the hub 17. Referring to FIG. 4 and FIG. 6, the inner circumference of the plate 21 is welded to the outside of the hub 17, and the outside circumference of the plate 21 is welded to the sidewalls 19 of the wheel 13.

In the first embodiment of FIGS. 3 and 4, the gussets 23 are trapezoidal in shape and their non-parallel sides are welded equidistantly onto the plate 21 and sidewalls 19 of the wheel 13 at right angles to the drum 15. Small supporting gussets 25 are triangular in shape and are welded onto the plate 21 and the trapezoidal gussets 23.

In the cross-sectional view of the FIG. 4 wheel depicted in FIG. 7, the first embodiment wheel 13 having a drum 15 and a concave sidewall 19 surrounding the hub 17 is protected by an annular plate 21 supported by gussets 23.

In the second embodiment, referring to the drum 15 in FIGS. 5 and 6, a first set of four equidistantly spaced small gussets 28 are triangular in shape, and welded onto the plate 21 and to the sidewall 19 of the wheel 13. A second set of four equidistantly spaced larger gussets 26 are welded to the plate 21, arranged 5 degrees askew from the first set of gussets 28, and perpendicularly about the hub 17. 45

Thus, two embodiments of a modification of the conventional debris catching wheels have been shown to result in much less debris being caught by the innovative wheels. 10

It is to be understood that the present invention is not limited to the sole embodiments described above, but encompasses any and all embodiments within the scope of the following claims.